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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/083,284	02/26/2002	Roy Martin	S01364/70033 PCL	4144
37462	7590	12/23/2003	EXAMINER	
LOWRIE, LANDO & ANASTASI RIVERFRONT OFFICE ONE MAIN STREET, ELEVENTH FLOOR CAMBRIDGE, MA 02142			LAWRENCE JR, FRANK M	
			ART UNIT	PAPER NUMBER
			1724	

DATE MAILED: 12/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No. 10/083,284	Applicant(s) MARTIN, ROY
Examiner Frank M. Lawrence	Art Unit 1724

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-26 and 28-30 is/are rejected.
- 7) ☒ Claim(s) 27 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The incorporation of essential material in the specification by reference to a foreign application or patent, or to a publication is improper. Applicant is required to amend the disclosure to include the material incorporated by reference. The amendment must be accompanied by an affidavit or declaration executed by the applicant, or a practitioner representing the applicant, stating that the amendatory material consists of the same material incorporated by reference in the referencing application. See *In re Hawkins*, 486 F.2d 569, 179 USPQ 157 (CCPA 1973); *In re Hawkins*, 486 F.2d 579, 179 USPQ 163 (CCPA 1973); and *In re Hawkins*, 486 F.2d 577, 179 USPQ 167 (CCPA 1973). This objection refers to the reference on page 6 to a publication.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 46, 48. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 10-12, 22 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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5. Claims 10-12 each recite the limitation "the surface" in line 1. There is insufficient antecedent basis for this limitation in the claim. It is unclear which surface is being referred to, however "the channel surface" is assumed for examination.

6. Claims 22 and 23 each recite the limitation "the liquid" in line 1. There is insufficient antecedent basis for this limitation in the claim. It is unclear whether "the liquid" refers to the water in the water system of the solution produced from pure water.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, 13, 14, 17-20 and 28-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Pisani (4,990,260).

9. Pisani '260 teaches a method and apparatus for removing oxidizable contaminants from a source of high purity water, comprising a high purity water storage tank (40), a hydroxyl free radical generator (52) with an inlet connected to the tank, a 254 nm UV radiation source (54) disposed to irradiate the water in the generator and generate radicals, a generator outlet that can return irradiated water back to the storage tank, and a cavitation nozzle (44) connected between the generator and tank to accelerate mixing of irradiated water and free radicals before mixing back into the storage tank (figure 2, col. 1, lines 10-21, col. 5, lines 23-51, col. 6, line 54 to col. 7, line 34). The water is pretreated to acidify and reduce turbidity and organic content (figure 1, col. 6, lines 10-54).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pisani '260.
12. Pisani '260 discloses all of the limitations of the claims except that the water is irradiated for about 1-100 seconds and that turbidity is less than 1 NTU. It is submitted that absent a showing of criticality or unexpected results, the treatment time and preferred turbidity level of the water source are parameters that would have been routinely optimized by one having ordinary skill in the art at the time of the invention based on the desired level of oxidation purification and minimum purity of the source that does not result in an adverse effect on the process.
13. Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pisani '260 in view of the Japanese publication (JP 11033542 A).
14. Pisani '260 discloses all of the limitations of the claims except that the surface of the channel is reflective to UV radiation and that the wall of the channel comprises stainless steel, titanium, or alloys of those. JP '542 discloses a system for producing hydroxyl radicals in a bath tub water source, comprising a conduit diverting water from the tub, a UV source for irradiating water in the conduit, a reflector (61), and a stainless steel cover (3) (see abstract, figures 5, 6). It would have been obvious to one having ordinary skill in the art at the time of the invention to use a reflective conduit surface in order to provide a means for amplifying UV radiation by reflecting

UV rays directed away from the water source back to the source. It would have also been obvious to construct the channel from a material such as stainless steel in order to provide a material that resists corrosion.

15. Claims 5, 6, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pisani '260 in view of Gonzalez-Martin et al. (5,779,912).

16. Pisani '260 discloses all of the limitations of the claims except that a hydroxyl donor is added to the water and that the channel surface is coated with titanium dioxide to promote free radical production. Gonzalez-Martin et al. '912 disclose a photocatalytic reactor for producing hydroxyl radicals from a water or water/peroxide mixture, comprising a channel including a substrate wall (14) surrounding a UV radiation source and a titanium dioxide coating on the substrate wall (figures 1, 1a, 2, col. 1, lines 38-48, col. 2, lines 20-29, col. 5, line 33 to col. 6, line 23). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the system of Pisani '260 by adding a peroxide and using a titanium dioxide coating in order provide a device that further promotes the production of hydroxyl free radicals for contaminant oxidation.

17. Claims 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pisani '260 in view of Peterson (4,952,376).

18. Pisani '260 disclose all of the limitations of the claims except that the UV lamp is separated from the water by a quartz wall that is spaced from the channel surface at less than about 0.1 mm. Peterson '376 discloses a water oxidation chamber comprising flow-enclosed UV lamps that are separated from water flow by a quartz sleeve (32) (col. 3, line 51 to col. 4, line 2). It would have been obvious to one having ordinary skill in the art at the time of the invention to

enclose the UV lamps in a quartz sleeve in order to reduce the temperature gradient across the lamp while providing a favorable combination of heat resistance, chemical resistance, mechanical strength, and high UV transmittance. It is submitted that absent a showing of criticality or unexpected results, the distance between the sleeve and the conduit surface is a parameter that would have been routinely optimized by one having ordinary skill in the art at the time of the invention based on the desired level of UV radiation applied to the process water.

19. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pisani '260 in view of Gonzalez-Martin et al. '912 as applied to claims 15 and 16 above, and further in view of Schulte et al. (5,348,665).

20. Pisani '260 in view of Gonzalez-Martin et al. '912 disclose all of the limitations of the claims as described in paragraph 16 above except that the produced solution has a strength of at least about 0.5% as active hydrogen peroxide. Schulte et al. '665 disclose a water/UV/hydrogen peroxide system for producing hydroxyl radicals for water oxidation, wherein the amount of peroxide can be easily determined by one skilled in the art in an orienting test (col. 1, lines 8-18, col. 4, lines 28-49). Absent a showing of criticality or unexpected results, the level of hydrogen peroxide is a parameter that would have been routinely optimized by one having ordinary skill in the art at the time of the invention based on the desired level of hydroxyl donor that is necessary for the purification application.

21. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pisani '260 in view of Bieler et al. (4,456,512).

22. Pisani '260 discloses all of the limitations of the claim except that the radiation is actinic. Bieler et al. '512 disclose a photochemical reactor that uses actinic radiation. It would have been

obvious to one having ordinary skill in the art at the time of the invention to modify the system of Pisani '260 by using an the actinic radiation configuration of Bieler et al. '512 in order to provide a system that reduces the wall and fluid thickness that must be penetrated by irradiation, thereby allowing more complete irradiation and the consequent photochemical reactions.

Allowable Subject Matter

23. Claim 27 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional references listed on the attached PTO-892 form disclose UV oxidation systems.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank M. Lawrence whose telephone number is 571-272-1161. The examiner can normally be reached on Mon-Thurs 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Blaine Copenheaver can be reached on 571-272-1156. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-0987.

Frank M. Lawrence
Primary Examiner
Art Unit 1724

Frank Lawrence 12-11-03

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